

## CLAIMS

1. A quantity totalizer for a three-dimensional arrangement and adjustment CAD, comprising: integrating means for referring to parts  
5 information stored in the three-dimensional arrangement and adjustment CAD and associating line information, which is separated from the parts information for storage and which is unique to a line, with the parts information to generate integrated information in which the quantity of parts is totaled; numbering means for systematically numbering the integrated  
10 information and outputting a quantity totalization result; and comparing means for comparing the quantity totalization result output by the numbering means with a parts number column in a design drawing produced with the three-dimensional arrangement and adjustment CAD to check the parts having the same parts information and line information  
15 against each other and replacing parts numbers in the parts number column in the design drawing produced with the three-dimensional arrangement and adjustment CAD with parts numbers in the quantity totalization result output by the numbering means.
- 20 2. The quantity totalizer for the three-dimensional arrangement and adjustment CAD according to claim 1, wherein the parts information includes a parts type and a size.
3. The quantity totalizer for the three-dimensional arrangement and  
25 adjustment CAD according to claim 1, wherein the line information includes, at the least, a fluid name passing through pipes, a working pressure, a

working temperature, a material, a wall thickness, and a drawing number.

4. The quantity totalizer for the three-dimensional arrangement and adjustment CAD according to claim 1, further comprising reducing means  
5 for dividing the length of uncountable parts by a fixed length of countable parts for reduction to the number of the countable parts having the fixed length when the uncountable part is longer than the fixed length and for summing up the lengths of the uncountable parts until the fixed length is given for reduction to the number of the countable parts having the fixed  
10 length when the uncountable part is shorter than the fixed length.
5. The quantity totalizer for the three-dimensional arrangement and adjustment CAD according to claim 1, further comprising converting means  
15 for converting the parts information stored in the three-dimensional arrangement and adjustment CADs of different types into a uniform data format to collectively manage the converted parts information.
6. The quantity totalizer for the three-dimensional arrangement and adjustment CAD according to claim 1, further comprising checking means  
20 for checking the integrated information against a past quantity totalization result to number parts that have not been numbered.
7. The quantity totalizer for the three-dimensional arrangement and adjustment CAD according to claim 1, wherein a template for a form, in  
25 which necessary information in the quantity totalization result is output, is provided.

8. The quantity totalizer for the three-dimensional arrangement and adjustment CAD according to claim 1, having a conversion function for converting a description language and a unit system of the form and the design drawing.

9. A quantity totalizer for a three-dimensional arrangement and adjustment CAD, comprising: integrating means for referring to parts information stored in the three-dimensional arrangement and adjustment CAD and associating line information, which is separated from the parts information for storage and which is unique to a line, with the parts information to generate integrated information in which the quantity of parts is totaled; numbering means for systematically numbering the integrated information and outputting a quantity totalization result; comparing means for comparing the quantity totalization result output by the numbering means with a parts number column in a design drawing produced with the three-dimensional arrangement and adjustment CAD to check the parts having the same parts information and line information against each other and replacing parts numbers in the parts number column in the design drawing produced with the three-dimensional arrangement and adjustment CAD with parts numbers in the quantity totalization result output by the numbering means; extracting means for classifying the parts into automatically numbered parts and manually numbered parts and extracting the parts information and the line information, concerning the manually numbered parts, from a database in the three-dimensional arrangement and adjustment CAD for check; and manually-numbering means for manually

numbering the parts having the parts information and the line information extracted by the extracting means.

10. The quantity totalizer for the three-dimensional arrangement and  
5 adjustment CAD according to claim 9, wherein attribute information concerning the parts, which is extracted and checked by the extracting means in order to determine the parts manually numbered by the manually-numbering means, includes all of a line name, a parts type, and a size or includes only the parts type and the size.

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11. The quantity totalizer for the three-dimensional arrangement and adjustment CAD according to claim 9, wherein the parts information is integrated with the line information, which are extracted by the extracting means, to produce a parts list, at least one parts number that is determined  
15 in advance is manually input in the parts list by the manually-numbering means, and the manually input data is reflected in the parts number column in the database in the three-dimensional arrangement and adjustment CAD.

20 12. The quantity totalizer for the three-dimensional arrangement and adjustment CAD according to claim 9, wherein the integrating means refers to the line information and the database in the three-dimensional arrangement and adjustment CAD, in which the manually input data input by the manually-numbering means is reflected, to separate the  
25 automatically numbered parts from the manually numbered parts and totalizes the number of countable parts and the total length of uncountable

parts to produce the quantity totalization result.

13. The quantity totalizer for the three-dimensional arrangement and adjustment CAD according to claim 9, wherein the integrating means  
5 separates the automatically numbered parts from the manually numbered parts for quantity totalization, compares the information before a revision with the information after the revision, and adds a shortfall before the revision to the information after the revision when the number of parts before the revision is smaller than the number of parts after the revision.

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14. The quantity totalizer for the three-dimensional arrangement and adjustment CAD according to claim 9, wherein the extracting means gives attribute information representing parent-to-child relationship between the parts to a parts list extracted by the extracting means, reduces the parts  
15 numbers of child parts, among the parts that are different in all of a line name, a parts type, and a size or any of them, to the parts numbers of parent parts to collectively number the parts, and totalizes the both the parent parts and the child parts.

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15. The quantity totalizer for the three-dimensional arrangement and adjustment CAD according to claim 9, wherein a symbol indicating that a yield rate is considered, the symbol being attribute information, is added to the line information to separate parts for which the yield rate is considered from parts for which the yield rate is not considered; the parts information  
25 and the line information concerning uncountable parts stored in the database in the three-dimensional arrangement and adjustment CAD are

extracted by the extracting means for check to determine the uncountable parts for which the yield rate is considered; true lengths, which are the actual lengths of the uncountable parts, are calculated by the reducing means for the uncountable parts for which the yield rate is considered; and  
5 extra lengths, which is the difference between the true lengths and a fixed length at the time of purchase, input in advance, are calculated.

16. The quantity totalizer for the three-dimensional arrangement and adjustment CAD according to claim 9, wherein a symbol indicating that a  
10 yield rate is considered, the symbol being attribute information, is added to the line information to separate parts for which the yield rate is considered from parts for which the yield rate is not considered; the parts information and the line information concerning uncountable parts stored in the database in the three-dimensional arrangement and adjustment CAD are  
15 extracted by the extracting means for check to determine the uncountable parts for which the yield rate is considered; a fixed length, which is the length of the uncountable parts at time of purchase, is input by the manually-numbering means; the fixed length is subtracted from true lengths, which are the lengths of the uncountable parts for which the yield  
20 rate is considered, when the true lengths are larger than the fixed length to reduce the uncountable parts to uncountable parts having lengths smaller than the fixed length; extra lengths are calculated by subtracting the true lengths, which is the actual lengths of the uncountable parts, from the fixed length to compare the true lengths of all the parts for which the extra  
25 lengths are calculated with the extra lengths thereof; addition of a longest true length to a shortest extra length is repeated to reduce the uncountable

parts to the countable parts having the fixed length; and the number of the countable parts having the fixed length is totaled.

17. The quantity totalizer for the three-dimensional arrangement and adjustment CAD according to claim 9, wherein a fixed length, which is the length of uncountable parts at the time of purchase, is manually input, by the manually-numbering means, in a parts list extracted by the extracting means, and the input information is reflected in a fixed length column in the parts information stored in the database in the three-dimensional arrangement and adjustment CAD.

18. The quantity totalizer for the three-dimensional arrangement and adjustment CAD according to claim 9, wherein the line information is stored in a table different from a table including a fixed length and, when the line information is specified, the fixed length of the corresponding uncountable parts is reflected in a parts list extracted by the extracting means.

19. A quantity totalizing program for a three-dimensional arrangement and adjustment CAD, comprising: integrating means for referring to parts information stored in the three-dimensional arrangement and adjustment CAD and associating line information, which is separated from the parts information for storage and which is unique to a line, with the parts information to generate integrated information in which the quantity of parts is totaled; numbering means for systematically numbering the integrated information and outputting a quantity totalization result; and comparing means for comparing the quantity totalization result output by the

numbering means with a parts number column in a design drawing produced with the three-dimensional arrangement and adjustment CAD to check the parts having the same parts information and line information against each other and replacing parts numbers in the parts number column in the design drawing produced with the three-dimensional arrangement and adjustment CAD with parts numbers in the quantity totalization result output by the numbering means.

20. A quantity totalizing program for a three-dimensional arrangement and adjustment CAD, comprising: integrating means for referring to parts information stored in the three-dimensional arrangement and adjustment CAD and associating line information, which is separated from the parts information for storage and which is unique to a line, with the parts information to generate integrated information in which the quantity of parts is totalized; numbering means for systematically numbering the integrated information and outputting a quantity totalization result; comparing means for comparing the quantity totalization result output by the numbering means with a parts number column in a design drawing produced with the three-dimensional arrangement and adjustment CAD to check the parts having the same parts information and line information against each other and replacing parts numbers in the parts number column in the design drawing produced with the three-dimensional arrangement and adjustment CAD with parts numbers in the quantity totalization result output by the numbering means; extracting means for classifying the parts into automatically numbered parts and manually numbered parts and extracting the parts information and the line information, concerning the manually



numbered parts, from a database in the three-dimensional arrangement and adjustment CAD for check; and manually-numbering means for manually numbering the parts having the parts information and the line information extracted by the extracting means.

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21. A quantity totalizing method for a three-dimensional arrangement and adjustment CAD, comprising the steps of: referring to parts information stored in the three-dimensional arrangement and adjustment CAD and associating line information, which is separated from the parts information  
10 for storage and which is unique to a line, with the parts information to generate integrated information in which the quantity of parts is totalized; systematically numbering the integrated information and producing a quantity totalization result; and comparing the quantity totalization result with a parts number column in a design drawing produced with the three-  
15 dimensional arrangement and adjustment CAD to check the parts having the same parts information and line information against each other and replacing parts numbers in the parts number column in the design drawing produced with the three-dimensional arrangement and adjustment CAD with parts numbers in the quantity totalization result output by the  
20 numbering means.

22. A quantity totalizing method for a three-dimensional arrangement and adjustment CAD, comprising the steps of: referring to parts information stored in the three-dimensional arrangement and adjustment CAD,  
25 associating line information, which is separated from the parts information for storage and which is unique to a line, with the parts information,

referring to the line information and the parts information stored in the three-dimensional arrangement and adjustment CAD to classify parts into automatically numbered parts and manually numbered parts, and associating the line information with the parts information to generate

5 integrated information in which the quantity of the parts is totalized; extracting the line information concerning the manually numbered parts from a database in the three-dimensional arrangement and adjustment CAD, manually numbering the parts having the extracted line information, and systematically numbering the integrated information to produce a quantity

10 totalization result; comparing the quantity totalization result with a parts number column in a design drawing produced with the three-dimensional arrangement and adjustment CAD to check the parts having the same parts information and line information against each other and replacing parts numbers in the parts number column in the design drawing produced with

15 the three-dimensional arrangement and adjustment CAD with parts numbers in the quantity totalization result output by the numbering means.